

298227

L1210500002 - Marion County
Sandoval Zinc Company
ILD053980454
Superfund/HRS

CERCLA

Site Inspection

Prioritization

Report



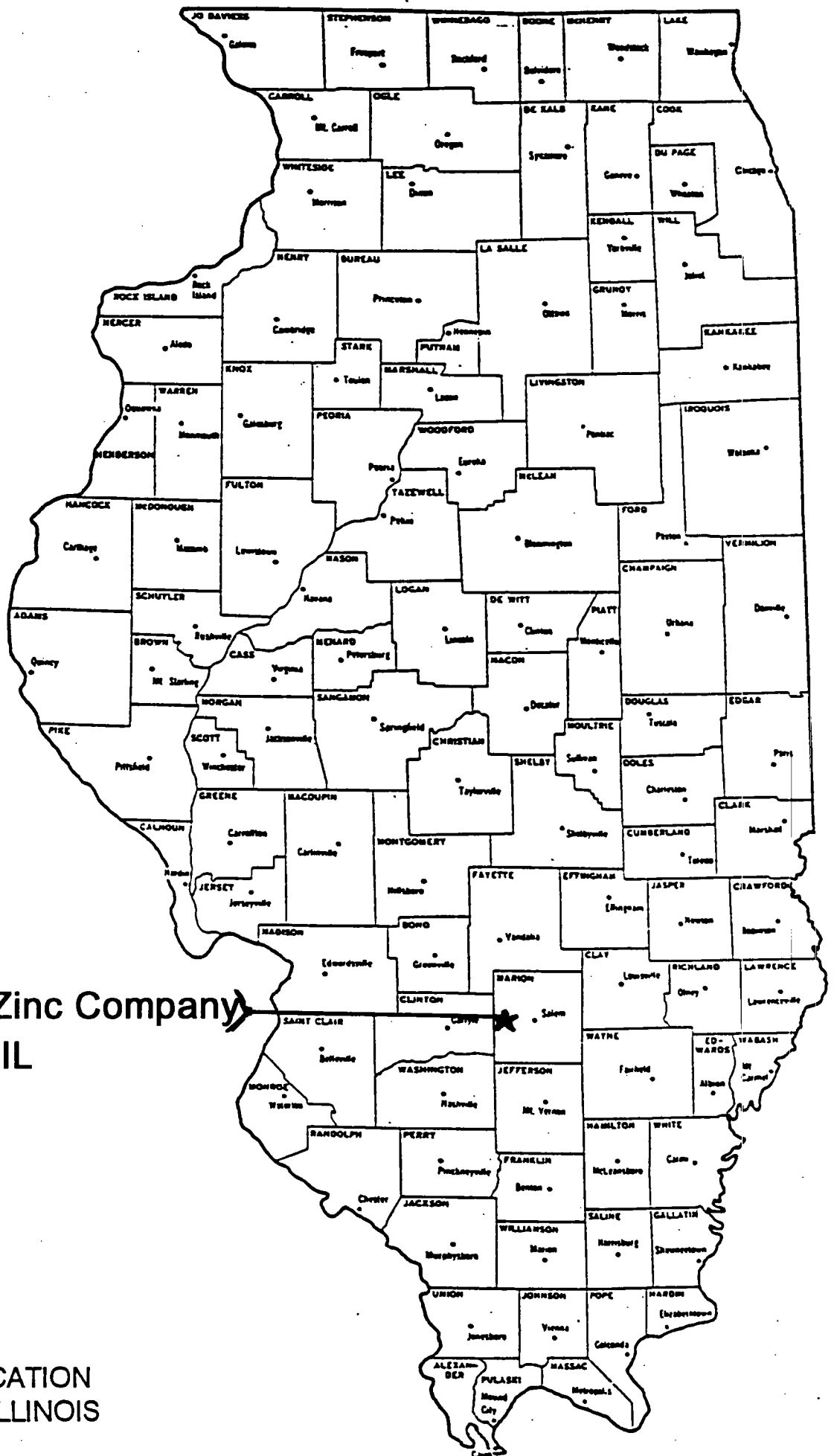
**Illinois Environmental
Protection Agency**

2200 Churchill Road
P. O. Box 19276
Springfield, IL 62794-9276

APPENDIX A

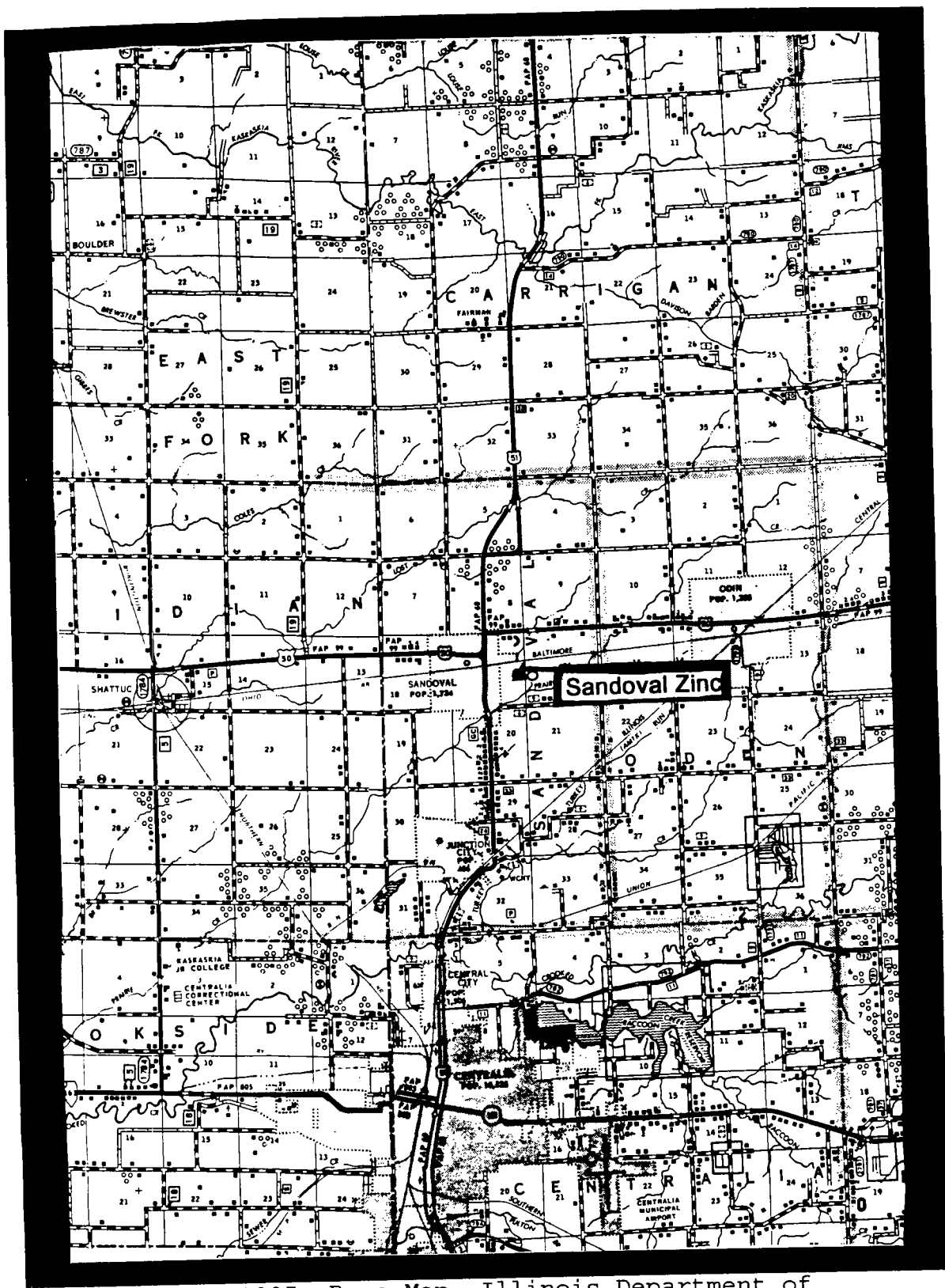
APPENDIX A

- 1 Illinois State Site Location Map
- 2 Regional Area Map
- 3 Site Topography Map
- 4 Wetland Map
- 5 Sample Location Maps
- 6 Sample Description Table, December, 1994 - Site Inspection Prioritization
- 7 Key Sample Summary, December, 1994 - Site Inspection Prioritization



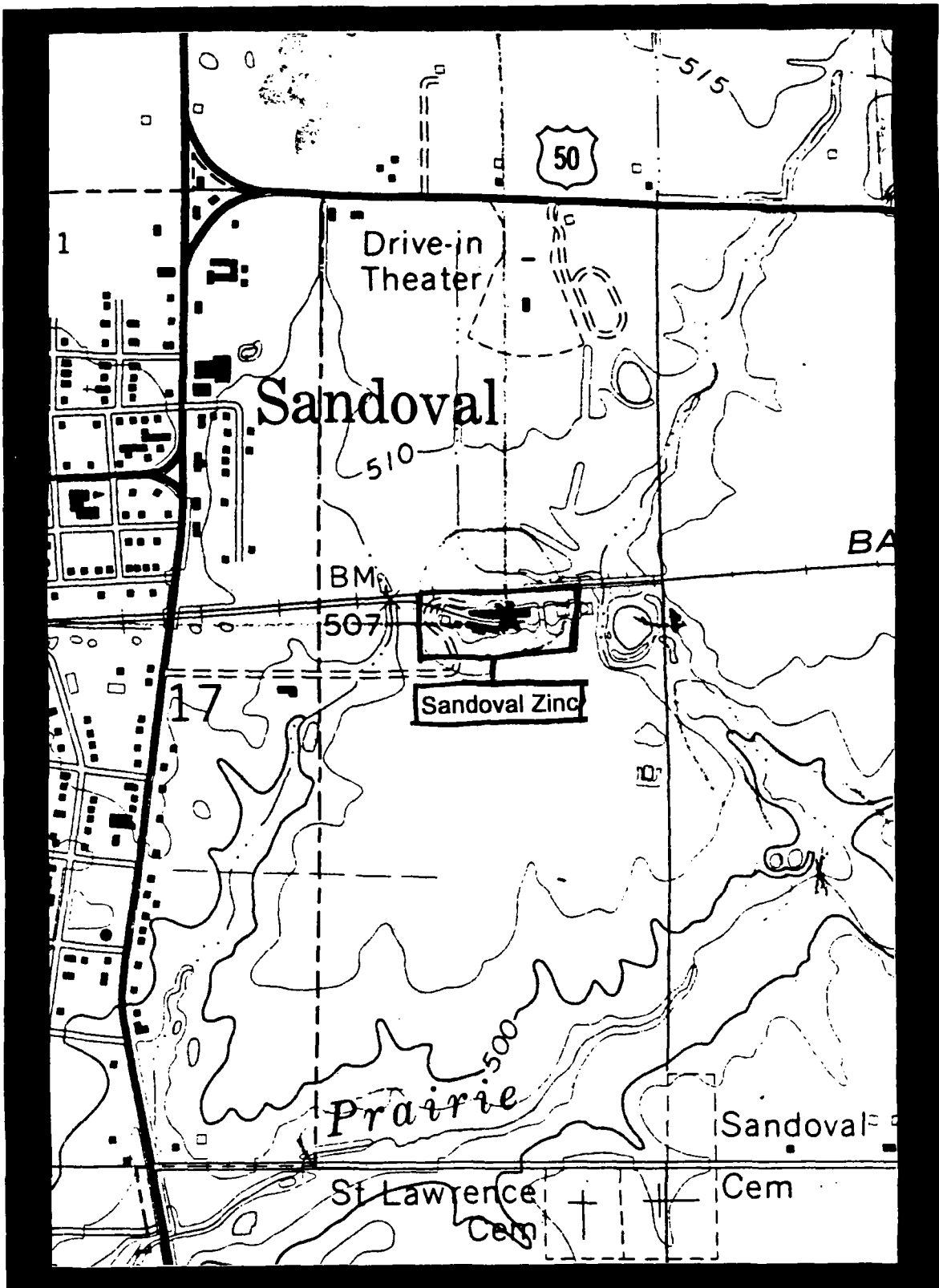
Sandoval Zinc Company
Sandoval, IL

SITE LOCATION
WITHIN ILLINOIS



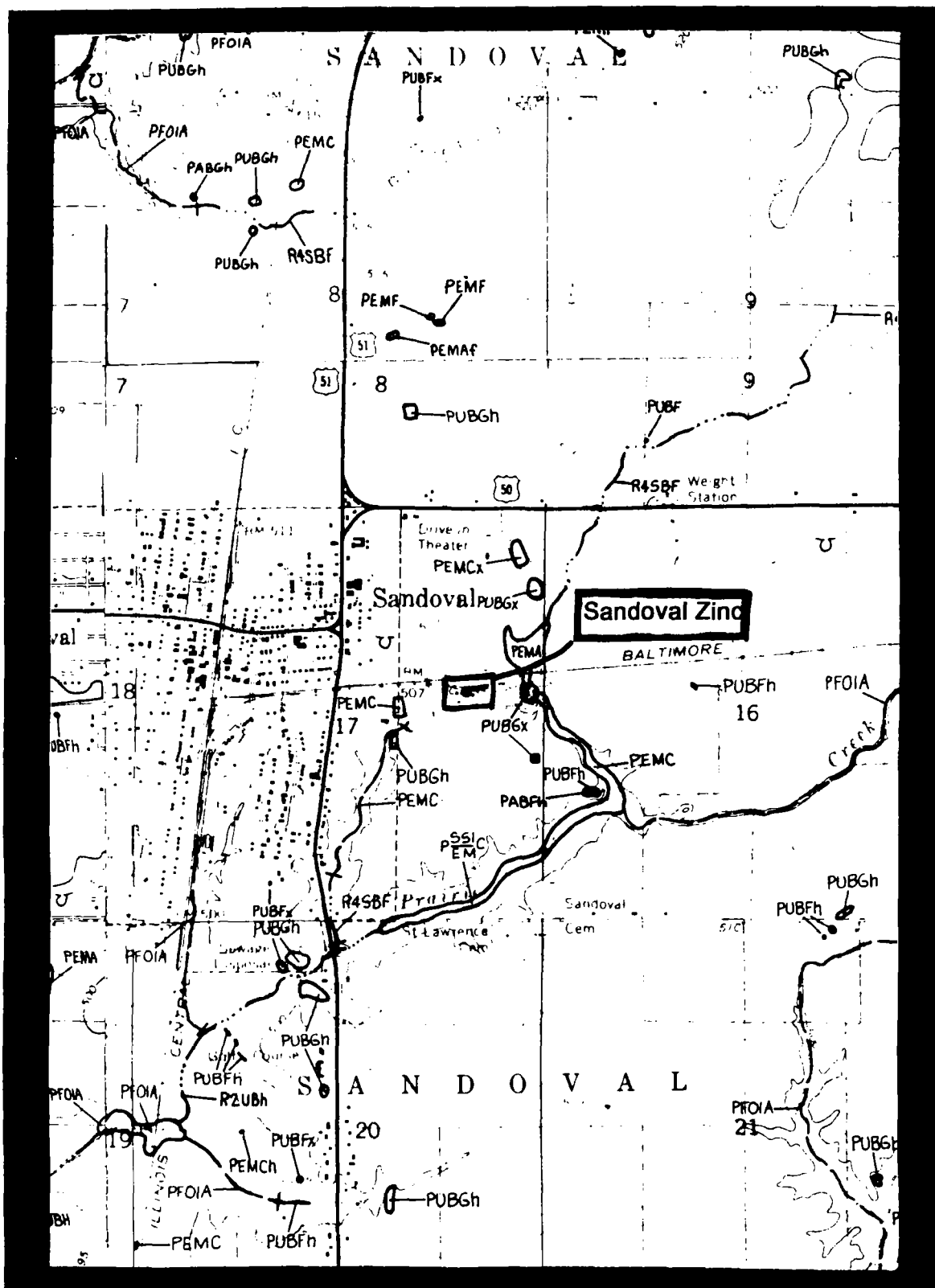
Source: IEPA, 1995. Base Map: Illinois Department of Transportation, Marion County, 1986.

Regional Area Map



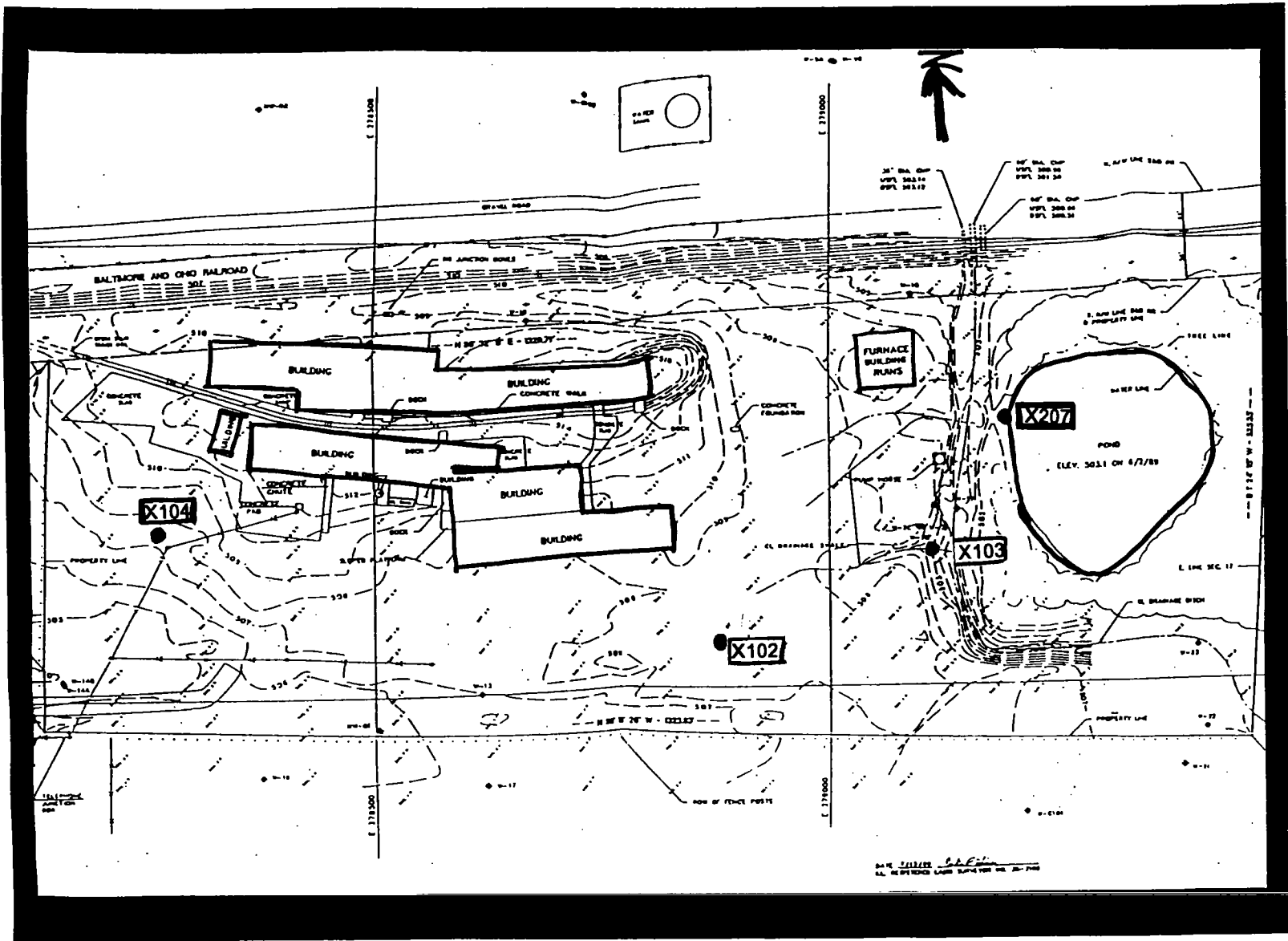
Source: IEPA, 1995. Base Map: ISGS, Centralia East, IL 1970. Centralia West, IL 1969. Boulder, IL 1969. Fairman, IL 1970.

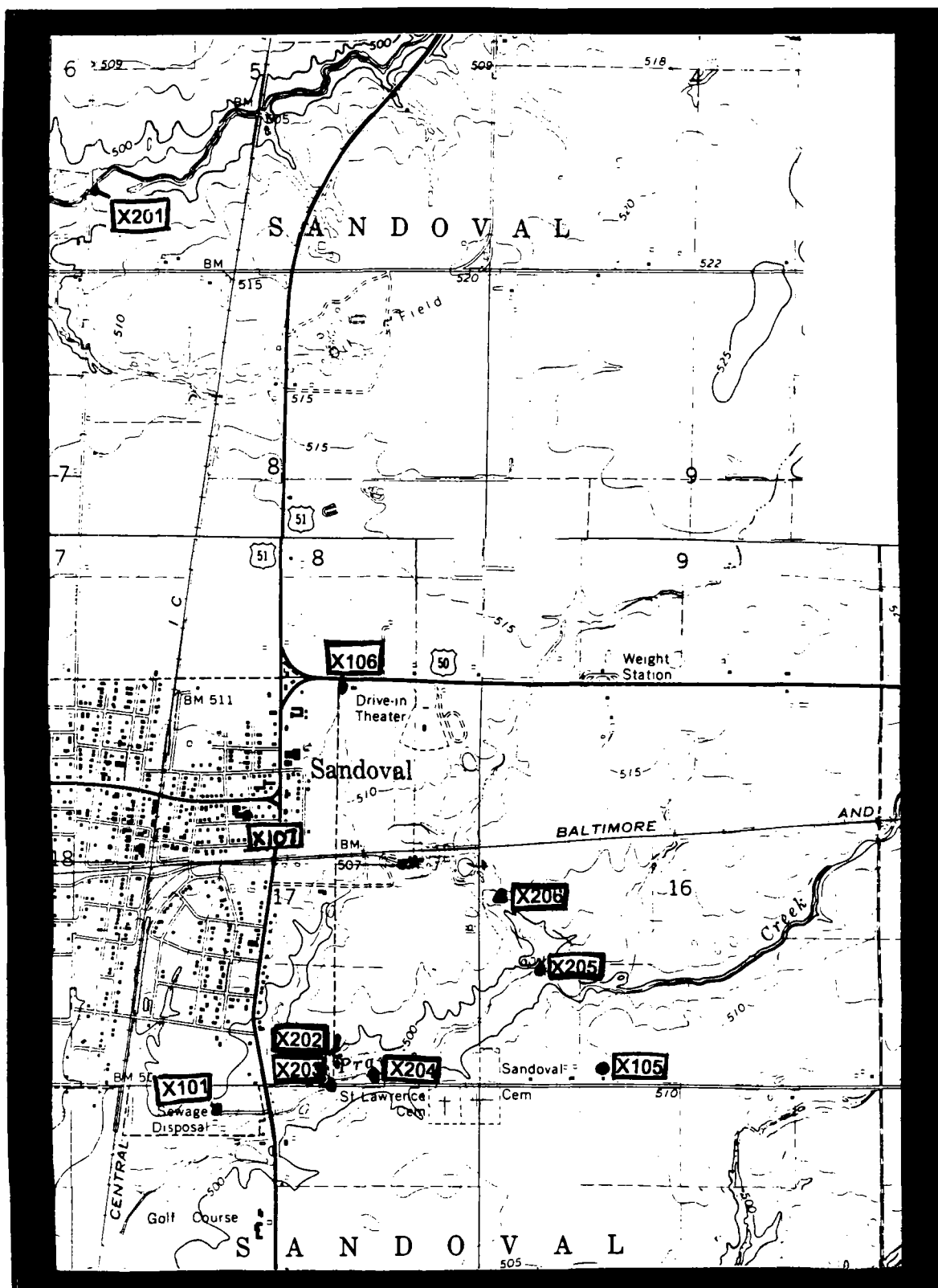
Site Topography



Source: IEPA, 1995. Base Map: ISGS, Centralia East, IL 1987. Centralia West, 1987. Boulder, 1987. Fairman, 1987.

Wetland Map





Source: IEPA, 1995. Base Map: ISGS, Centralia East, IL 1970.

Offsite Sample Location Map

SAMPLE DESCRIPTION TABLE
SANDOVAL ZINC COMPANY

SAMPLE	DATE	TIME	LOCATION	APPEARANCE
X101	12/14/94	10:00 AM	Background sample taken at the Sandoval WWTP approximately 100 feet north of concrete clarifier.	Medium to dark brown; silty. Depth - 0-4 inches.
X102	12/13/94	10:00 AM	Sample taken in the southeastern portion of the site, approximately 20 feet southwest of rusted tank.	Dark gray cinder-like material to light brown clay. Depth - 1.5-2.5 feet.
X103	12/13/94	10:30 AM	Sample taken where drainage leaves the eastern boundary of site into intermittent eastern drainageway. Approximately ten feet west of eastern fence and 100 feet north of southern fence.	Medium brown clay. Depth - 0-4 inches (approx.)
X104	12/13/94	11:05 AM	Sample taken in the west-central portion of the site, approximately 150 feet southwest of dark gray structure and 150 feet east of western fence.	Medium to dark brown cindery material with small grained stone. Depth - 0-18 inches.
X105	12/13/94	5:15 PM	Taken in residential yard to the south of the site. Sample taken approximately ten feet south of satellite dish.	Medium brown loam with some organic material. Depth - 0-4 inches
X106	12/14/94	9:20 AM	Sample taken from residential yard to the north of the site. Approximately 125 feet south-southeast of residence.	Silty gray to brown. Depth - 0-4 inches
X107	12/14/94	11:30 AM	Sample taken at the Sandoval Elementary School, approximately 25 feet east of swingset on south side of school.	Appearance: NA Depth: 0-6 inches
X201	12/14/94	10:30 AM	Background sediment sample taken from unnamed stream located north of Sandoval.	Sandy with silt, some gravel. Medium brown. Depth: 0-6 inches
X202 X203	12/13/94	11:50 AM	Sediment sample taken from Prairie Creek approximately 800 feet east of Illinois Route 51 and approximately 75 feet east of old bridge.	Dark to medium brown silt with silt-like clay and some sand. Depth: 0.5 - 8 inches.
X204	12/13/94	12:30 PM	Sediment sample taken from Prairie Creek. Approximately 1056 feet east of X202/X203	Silty black-gray. Depth: 0-6 inches
X205	12/13/94	2:15 PM	Sediment sample taken from Prairie Creek, approximately 2 feet west of the confluence of Prairie Creek and the intermittent stream which flows south past the eastern boundary of the site.	Dark brownish-gray silt. Depth: 0-4 inches
X206	12/13/94	2:40 PM	Sediment sample taken approximately 500 feet southeast of the site, along the eastern intermittent stream.	Appearance: NA Depth: NA
X207	12/13/94	4:00 PM	Sediment sample taken from pond located immediately east of site.	Silty gray with organic matter. Depth: 0-5 inches

SANDOVAL ZINC
ILD053980454

CERCLA SITE INSPECTION PRIORITIZATION SOIL SAMPLE RESULTS

DECEMBER 13 & 14, 1994

SAMPLING POINT	X101 12-14-94	X102 12-13-94	X103 12-13-94	X104 12-13-94	X105 12-13-94	X106 12-14-94	X107 12-14-94
VOLATILES (ppb)							
2-Butanone (MEK)	--	--	--	--	3.0 J	2.0 J	--
1,1,1-Trichloroethane	--	2.0 J	--	--	--	--	--
Toluene	--	--	--	25.0	6.0 J	--	39.0
SEMIVOLATILES (ppb)							
Carbazole	--	--	--	--	--	--	120.0 J
Naphthalene	--	--	--	1600.0	--	--	--
2-Methylnaphthalene	--	--	--	2700.0	--	--	320.0 J
Acenaphthene	--	--	--	--	--	--	62.0 J
Dibenzofuran	--	--	--	730.0	--	--	190.0 J
Fluorene	--	--	--	450.0	--	--	87.0 J
Phenanthrene	--	--	--	1300.0	--	--	920.0
Anthracene	--	--	--	97.0 J	--	--	160.0 J
Fluoranthene	--	--	--	450.0	--	--	1100.0
Pyrene	--	--	--	950.0	--	--	1400.0
Butylbenzylphthalate	--	--	--	--	--	--	58.0 J
Benzo(a)anthracene	--	--	--	370.0 J	--	--	570.0
Chrysene	--	--	--	390.0 J	--	--	710.0
bis(2-Ethylhexyl)phthalate	--	86.0 J	120.0 J	44.0 J	--	--	630.0
Benzo(b)fluoranthene	--	--	--	340.0 J	--	--	1100.0
Benzo(k)fluoranthene	--	--	--	210.0 J	--	--	310.0 J
Benzo(a)pyrene	--	--	--	210.0 J	--	--	500.0
Indeno(1,2,3-cd)pyrene	--	--	--	120.0 J	--	--	440.0 J
Dibenz(a,h)anthracene	--	--	--	--	--	--	150.0 J
Benzo(g,h,i)perylene	--	--	--	140.0 J	--	--	460.0 J
PESTICIDES (ppb)							
Dieldrin	--	--	--	--	17.0	18.0	--
4,4'-DDE	--	--	--	54.0 P	--	--	2400.0 E
Endrin	--	--	--	9.5 P	--	--	--
4,4'-DDD	--	--	--	--	--	--	340.0
4,4'-DDT	--	--	--	75.0 E	--	--	760.0 E
gamma-Chlordane	--	5.2	--	--	--	--	--
INORGANICS (ppm)							
Antimony	--	--	--	81.2	--	3.5 B	10.4 B
Arsenic	--	--	--	54.9	--	--	--
Barium	--	--	--	522.0	--	--	--
Cadmium	--	0.9 B	--	3.5	--	--	--
Copper	--	--	--	2320.0	--	--	224.0
Iron	--	--	--	--	--	--	58000.0
Lead	--	--	--	4260.0	--	--	634.0
Mercury	--	--	--	0.6	--	--	0.9
Nickel	--	--	--	663.0	--	--	--
Silver	--	--	--	3.2	--	--	--
Sodium	--	--	--	946.0 B	--	--	574.0 B
Thallium	--	--	--	--	4.0	2.4 B	--
Zinc	--	--	2220.0	128000.0	--	--	--
Cyanide	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--
Sulfide	--	--	--	--	--	--	--

SANDOVAL ZINC
ILD053980454

CERCLA SITE INSPECTION PRIORITIZATION SEDIMENT SAMPLE RESULTS
DECEMBER 13 & 14, 1994

SAMPLING POINT	X201 12-14-94	X202 12-13-94	X203 12-13-94	X204 12-13-94	X205 12-13-94	X206 12-13-94	X207 12-13-94
VOLATILES (ppb)							
Acetone	--	--	--	--	--	75.0 B	150.0 B
1,1,1-Trichloroethane	--	--	--	--	--	2.0 J	--
Toluene	--	--	--	--	--	--	7.0 J
SEMIVOLATILES (ppb)							
Naphthalene	--	68.0 J	--	--	--	--	--
2-Methylnaphthalene	--	89.0 J	--	--	--	--	--
Phenanthrene	--	--	55.0 J	60.0 J	--	--	61.0 J
Fluoranthene	--	--	--	86.0 J	--	--	130.0 J
Pyrene	--	--	--	81.0 J	--	--	86.0 J
Chrysene	--	--	--	60.0 J	--	--	53.0 J
Benzo(b)fluoranthene	--	--	--	72.0 J	--	--	--
PESTICIDES (ppb)							
Dieldrin	--	--	--	--	--	18.0	--
INORGANICS (ppm)							
Antimony	--	2.9 B	4.5 B	4.9 B	6.7 B	10.1 B	17.0
Cadmium	--	2.5	2.3	23.9	40.2	58.6	2.2
Copper	--	79.0	156.0	448.0	318.0	330.0	1950.0
Lead	--	--	257.0	674.0	1170.0	1060.0	1690.0
Mercury	--	--	--	--	--	0.2	0.2
Nickel	--	--	--	--	105.0	128.0	102.0
Potassium	--	--	--	1760.0	1670.0 B	2180.0	--
Silver	--	--	--	--	2.1 B	--	0.9 B
Zinc	--	698.0	698.0	2770.0	9290.0	10000.0	5240.0

APPENDIX B

APPENDIX C

TARGET COMPOUND LIST

Volatile Target Compounds

Chloromethane	1,2-Dichloropropane
Bromomethane	cis-1,3-Dichloropropene
Vinyl Chloride	Trichloroethene
Chloroethane	Dibromochloromethane
Methylene Chloride	1,1,2-Trichloroethane
Acetone	Benzene
Carbon Disulfide	trans-1,3-Dichloropropene
1,1-Dichloroethene	Bromoform
1,1-Dichloroethane	4-Methyl-2-pentanone
1,2-Dichloroethene (total)	2-Hexanone
Chloroform	Tetrachloroethene
1,2-Dichloroethane	1,1,2,2-Tetrachloroethane
2-Butanone	Toluene
1,1,1-Trichloroethane	Chlorobenzene
Carbon Tetrachloride	Ethylbenzene
Vinyl Acetate	Styrene
Bromodichloromethane	Xylenes (total)

Base/Neutral Target Compounds

Hexachloroethane	2,4-Dinitrotoluene
bis(2-Chloroethyl) Ether	Diethylphthalate
Benzyl Alcohol	N-Nitrosodiphenylamine
bis(2-Chloroisopropyl) Ether	Hexachlorobenzene
N-Nitroso-Di-n-Propylamine	Phenanthrene
Nitrobenzene	4-Bromophenyl-phenylether
Hexachlorobutadiene	Anthracene
2-Methylnaphthalene	Di-n-Butylphthalate
1,2,4-Trichlorobenzene	Fluoranthene
Isophorone	Pyrene
Naphthalene	Butylbenzylphthalate
4-Chloroaniline	bis(2-Ethylhexyl) Phthalate
bis(2-chloroethoxy) Methane	Chrysene
Hexachlorocyclopentadiene	Benzo(a) Anthracene
2-Chloronaphthalene	3,3'-Dichlorobenzidene
2-Nitroaniline	Di-n-Octyl Phthalate
Acenaphthylene	Benzo(b) Fluoranthene
3-Nitroaniline	Benzo(k) Fluoranthene
Acenaphthene	Benzo(a) Pyrene
Dibenzofuran	Indeno(1,2,3-cd) Pyrene
Dimethyl Phthalate	Dibenz(a,h) Anthracene
2,6-Dinitrotoluene	Benzo(g,h,i) Perylene
Fluorene	1,2-Dichlorobenzene
4-Nitroaniline	1,3-Dichlorobenzene
4-Chlorophenyl-phenylether	1,4-Dichlorobenzene

Acid Target Compounds

Benzoic Acid	2,4,6-Trichlorophenol
Phenol	2,4,5-Trichlorophenol
2-Chlorophenol	4-Chloro-3-methylphenol
2-Nitrophenol	2,4-Dinitrophenol
2-Methylphenol	2-Methyl-4,6-dinitrophenol
2,4-Dimethylphenol	Pentachlorophenol
4-Methylphenol	4-Nitrophenol
2,4-Dichlorophenol	

Pesticide/PCB Target Compounds

alpha-BHC	Endrin Ketone
beta-BHC	Endosulfan Sulfate
delta-BHC	Methoxychlor
gamma-BHC (Lindane)	alpha-Chlorodane
Heptachlor	gamma-Chlorodane
Aldrin	Toxaphene
Heptachlor epoxide	Aroclor-1016
Endosulfan I	Aroclor-1221
4,4'-DDE	Aroclor-1232
Dieldrin	Aroclor-1242
Endrin	Aroclor-1248
4,4'-DDD	Aroclor-1254
Endosulfan II	Aroclor-1260
4,4'-DDT	

Inorganic Target Compounds

Aluminum	Manganese
Antimony	Mercury
Arsenic	Nickel
Barium	Potassium
Beryllium	Selenium
Cadmium	Silver
Calcium	Sodium
Chromium	Thallium
Cobalt	Vanadium
Copper	Zinc
Iron	Cyanide
Lead	Sulfide
Magnesium	Sulfate

DATA QUALIFIERS

QUALIFIER	DEFINITION ORGANICS	DEFINITION INORGANICS
U	Compound was tested for but not detected. The sample quantitation limit must be corrected for dilution and for percent moisture. For soil samples subjected to GPC clean-up procedures, the CRQL is also multiplied by two, to account for the fact that only half of the extract is recovered.	Analyte was analyzed for but not detected.
J	Estimated value. Used when estimating a concentration for tentatively identified compounds (TICS) where a 1:1 response is assumed or when the mass spectral data indicate the presence of a compound that meets the identification criteria and the result is less than the sample quantitation limit but greater than zero. Used in data validation when the quality control data indicate that a value may not be accurate.	Estimated value. Used in data validation when the quality control data indicate that a value may not be accurate.
C	This flag applies to pesticide results where the identification is confirmed by GC/MS.	Method qualifier indicates analysis by the Manual Spectrophotometric method.
B	Analyte was found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.	The reported value is less than the CRDL but greater than the instrument detection limit (IDL).
D	Identifies all compounds identified in an analysis at a secondary dilution factor. If a sample or extract is re-analyzed at a higher dilution factor as in the "E" flag, the "DL" suffix is appended to the sample number on the Form I for the diluted sample, and all concentration values are flagged with the "D" flag.	Not used.
E	Identifies compounds whose concentrations exceed the calibration range for that specific analysis. All extracts containing compounds exceeding the calibration range must be diluted and analyzed again. If the dilution of the extract causes any compounds identified in the first analysis to be below the calibration range in the second analysis, then the results of both analyses must be reported on separate Forms I. The Form I for the diluted sample must have the "DL" suffix appended to the sample number.	The reported value is estimated because of the presence of interference.
A	This flag indicates that a TIC is a suspected aldol concentration product formed by the reaction of the solvents used to process the sample in the laboratory.	Method qualifier indicates analysis by Flame Atomic Absorption (AA).
M	Not used.	Duplicate injection (a QC parameter not met).

N	Not used	Spiked sample (a QC parameter not met).
S	Not used.	The reported value was determined by the Method of Standard Additions (MSA).
W	Not used.	Post digestion spike for Furnace AA analysis (a QC parameter) is out of control limits of 85% to 115% recovery, while sample absorbance is less than 50% of spike absorbance.
*	Not used.	Duplicate analysis (a QC parameter not within control limits).
+	Not used.	Correlation coefficient for MSA (a QC parameter) is less than 0.995.
P	Not used.	Method qualifier indicates analysis by ICP (Inductively Coupled Plasma) Spectroscopy.
CV	Not used.	Method qualifier indicates analysis by Cold Vapor AA.
AV	Not used.	Method qualifier indicates analysis by Automated Cold Vapor AA.
AS	Not used.	Method qualifier indicates analysis by Semi-Automated Cold Spectrophotometry.
T	Not used.	Method qualifier indicates Titrimetric analysis.
NR	The analyte was not required to be analyzed.	The analyte was not required to be analyzed.
R	Rejected data. The QC parameters indicate that the data is not usable for any purpose.	Rejected data. The QC parameters indicate that the data is not usable for any purpose.

TABLE OF CONTENTS

SECTION	PAGE
1 SITE BACKGROUND	
1.1 Introduction	1
1.2 Site Description	1
1.3 Site History	2
1.4 Regulatory History	3
2 SITE PRIORITIZATION ACTIVITIES	
2.1 Reconnaissance Activities	4
2.2 Sampling Activities	4
2.3 Sampling Results	4
3 SITE SOURCES	
3.1 Waste Pile	6
3.2 Contaminated Soils (Associated with Stack Emissions)	6
3.3 Contaminated Soils (Intermittent Drainageway)	7
3.4 Aboveground Tanks and Drums	7
4 MIGRATION PATHWAYS	
4.1 Groundwater Pathway	8
4.2 Surface Water Pathway	9
4.3 Soil Exposure	10
4.4 Air Pathway	10

0360-
WAC

SECTION 1 SITE BACKGROUND

1.1 Introduction

The Illinois Environmental Protection Agency's (IEPA or Agency) CERCLA Site Assessment program was tasked by Region V of the United States Environmental Protection Agency (USEPA) on September 27, 1994 to conduct a Site Inspection Prioritization (SIP) of the Sandoval Zinc site in Sandoval, Marion County, Illinois.

The site was added to the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) on December 1, 1983 in response to the state's concern regarding the site's impact on groundwater and surface water in the area. The IEPA has evaluated the site in the form of a CERCLA Preliminary Assessment and Screening Site Inspection (SSI). During the SSI of May, 1987, the sampling team collected four sediment samples from the drainageways existing on both sides of the facility in order to establish an observed release to surface waters. The sampling team also collected three groundwater samples from monitoring wells onsite in order to establish an observed release to groundwater.

The purpose of a Site Inspection Prioritization has been developed from USEPA directive and guidance information which outlines Site Assessment program strategies. The purpose of a Site Inspection Prioritization is to "...update the scoring of outstanding site inspections performed prior to the implementation of the revised Hazard Ranking System (HRS). The FSIP will quantify the threats posed by these sites and provide sufficient documentation for EPA to decide on the appropriate, future course of action. The FSIP process allows the Agency to review sites that have had a completed Screening Site Inspection (SSI) but lack a final determination regarding the need for further action. The FSIP review will indicate whether the SSI information meets a minimum standard to reflect the revised Hazard Ranking System (HRS) and scoring strategies mandated by EPA. The results of the FSIP will enable the EPA to determine if a site is likely to score above a 28.50 on the HRS and thus eligible for listing on the National Priorities List (NPL). EPA has mandated the establishment of the FSIP process in order to address the most hazardous sites first and to standardize the criteria by which sites are evaluated in the Superfund program."

1.2 Site Description

Sandoval Zinc is an inactive, abandoned zinc smelter located east of Sandoval, Illinois. The facility consists of an area approximately thirteen acres in size. The site is bordered by the Baltimore and Ohio Railroad and a farm field to the north, to the east and south by farmland, and to the west by a salvage company, a grain operation, and the town of Sandoval within a quarter mile of the site. An earthen road leads from Illinois Route 51 to the site. Access to the site is currently limited by an eight-foot cyclone fence, installed by the Illinois EPA. However, the fence is under need of constant repair due to unauthorized individuals efforts to access the site.

A water-filled surface impoundment is located along the eastern boundary of the site. The impoundment is a fishery as people are reported to consume fish caught in this impoundment.

Vegetation at the facility is almost non-existent and vegetation surrounding the facility is stressed. Run-off from the site enters two separate drainageways (to the east and west) that run into Prairie Creek at a distance of one-third to one-half mile. The east drainageway enters a marshy area located southeast of the site before it enters Prairie Creek. Prairie Creek is a tributary of the Kaskaskia River.

Residential areas, a day care and the Sandoval Elementary School are located approximately one-quarter of a mile west of the facility.

1.3 Site History

Sandoval Zinc began operations as a processor of zinc ore in 1890 and was converted to a secondary zinc smelter in 1915. Prior to 1970, wastes, consisting of a heavy metal-rich cinder and ash, were used for fill material around the plant building.

In order to comply with air pollution regulations, a scrubber was installed on the plant stack in 1970. Wastewater from this scrubber was disposed of in a lagoon (now backfilled and reported to be located on the southeast corner of the operation buildings) constructed from the cinders produced by past plant operations. The scrubber wastewater was allowed to seep into the ground until a sludge-like material remained. After large amounts of sludge were accumulated, the sludge was reprocessed for zinc recovery or allowed to dry before being sold to fertilizer companies. According to IEPA Bureau of Land files, the lagoon was in use for approximately ten years and measured 100 feet wide, 150 feet

long by four feet deep.

The plant was almost completely destroyed by fire on June 27, 1972 when an oil line feed to the furnaces ruptured and spilled oil onto the plant grounds. An ensuing fire destroyed all but two buildings. The burned buildings were rebuilt and operations continued until 1985. On December 19, 1986, Sandoval Zinc Company's charter in the State of Illinois was dissolved.

The current owner of the property is presently unknown. According to the Marion County Clerk's office, only one land transaction has occurred within the previous fifty years when a quit claim deed was conveyed in 1936 from M. Wheill Metals Company to Sandoval Zinc Company.

During a May 1990 Illinois inspection of the site, it was discovered that the site was being used by a salvage company for storing recyclable materials such as glass, plastic, cardboard, newspaper, and aluminum, as well as a location for dumping of demolition debris. In February and March 1991, fires broke out in debris stored on site and during both events, the fires burned uncontrolled for several days. An injunction was drafted by the Illinois Attorney General's Office after numerous attempts by the IEPA to get the salvage company to cease its burning and dumping at the site. The March 11, 1991 injunction against the salvage company directed them to discontinue collection and management of recyclable materials at the site. A draft feasibility study was developed by an IEPA contractor in March 1991. In April 1991, IEPA issued a seal order for the site and the fence that currently surrounds the site was constructed.

In November 1991, a tank containing diesel fuel ruptured due to cold weather and approximately 200 gallons of fuel was released in an area near the western drainageway. Cold weather kept the spill congealed and the migration of the diesel fuel oil was minimized.

1.4 Regulatory History

The Sandoval Zinc site is abandoned and consequently not regulated under the Resource Conservation and Recovery Act (RCRA), Atomic Energy Act (AEA), Toxic Substances Control Act (TSCA), Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), or the Uranium Mill Tailings Radiation Control Act (UMTRCA).

SECTION 2

SITE INSPECTION PRIORITIZATION ACTIVITIES

2.1 Reconnaissance Activities

A reconnaissance of the Sandoval Zinc site was conducted by this author on October 25, 1994, prior to sampling activities. Since the site is abandoned, no site representatives were interviewed. The following observations were made during the visit.

The site is enclosed by an eight-foot chain-link fence with a locked gate. The fencing, however, is in need of almost constant repair due to unauthorized persons gaining access to the site. At the time of the reconnaissance, the fence was accessible in numerous places. Two large buildings are located onsite. They are abandoned and are in a dilapidated state. The facility itself is covered with a gray, cindery ash and construction debris litters the site. Vegetation is almost non-existent on site and is stressed surrounding the site, especially in areas subject to site run-off.

An official with the Sandoval police department stated that he had observed unauthorized persons onsite on numerous occasions and has had to chase them off. He also stated that people consume fish from the surface impoundment located at the facility.

2.2 Sampling Activities

The field sampling portion of the Site Inspection Prioritization inspection of the Sandoval Zinc site occurred on December 13 and 14, 1994 at which time the sampling team collected 14 soil and sediment samples. No groundwater or surface water samples were taken due to the lack of targets in the area. The city of Sandoval obtains water from a municipal source (surface water body) and the nearest wells are one mile from site. Sample location maps and the Sample Description table can be found in Appendix A of this report. Standard Illinois EPA decontamination procedures were followed prior to the collection of all samples.

2.3 Sampling Results

Samples X102 through X104 were collected from the facility in order to further characterize the nature of wastes remaining at the facility.

Samples X105 and X106 were collected at two separate residences near the site. Sample X105 was taken at a residence located approximately one-quarter south of the site and sample X106 was collected approximately one-quarter mile north of the site. The samples were taken in order to characterize any potential contamination in the surrounding area that may be attributable to the site and or its past operations. Sample results revealed the presence of slightly elevated levels of thallium and dieldrin. Neither of these compounds were detected at the site.

Sample X107 was collected at the Sandoval Elementary School, located approximately one-quarter mile west of the site. The sample was taken in order to characterize any potential contamination in the surrounding area that may be attributable to the site. Sample results revealed the presence of pesticides (DDE, DDD, and DDT), semi-volatiles and metals (lead, copper, antimony, iron, and copper). However, at this time, only the metals can be attributed to the facility's operations.

Samples X202 through X207 were collected from the site's eastern drainageway and Prairie Creek, into which the drainageway flows. The samples were taken in order to document the release of site contaminants to the surface water pathway. Sample results revealed the presence of elevated levels of the following compounds: dieldrin and metals, including antimony, cadmium, copper, lead, mercury, nickel, and zinc.. Levels were found to be higher in drainageway sediment closer to the site and are found at lower concentrations as distance from the site increased. Results of the sampling revealed the presence of elevated levels of metals at levels that either met or exceeded the CERCLA program's criteria for an observed release and were detected in concentrations that exceeded the severe effects limits established in the Ontario Sediment Standards.

SECTION 3

SITE SOURCES

The following have been identified as sources of contamination at the Sandoval Zinc site:

3.1 Waste Pile

According to IEPA Bureau of Land files, the waste pile located at the Sandoval Zinc site was created by the direct deposition of cinders and ash (byproducts of the operation). The pile encompasses the entire site and is approximately eight acres in size and one to ten feet deep. This practice began with the opening of the facility in the late 1800's and ended in 1970 when a scrubber was placed on the stack and byproduct scrubber waste was placed in a scrubber lagoon and allowed to dry. After dewatering, the sludge-like material was sold to fertilizer companies or was reprocessed. The scrubber waste pond was constructed within the boundaries of the wastepile itself and was approximately one-half acre in size and four feet deep. The waste pile is presently uncovered and has no windbreak which would keep particulate from migrating away from the site. The pile is devoid of vegetation.

3.2 Contaminated Soils (associated with stack emissions)

Using the outermost points of documented contamination, approximately 600 acres of residential soils and agricultural lands are presently believed to have been contaminated by stack emissions at Sandoval Zinc. It was estimated that retort processing used at Sandoval resulted in the release of approximately 50-100 tons of metal rich emissions annually. These emissions were directed by prevailing winds over the city and the surrounding vicinity, depositing particulate from plant stack emissions. In 1970, a scrubber stack was installed on the stack in order to come into compliance with air emission standards.

A Sandoval Police officer stated that he had seen air emissions coming from the Sandoval Zinc site on different occasions settling over the city. Results of sampling within a one-quarter mile radius of the site revealed the presence of elevated levels of a number of heavy metals which were also emitted from the facility stacks. These contaminants include: antimony-10.4 ppm, copper-224 ppm, iron-58000 ppm, and lead-634 ppm.

3.3 Contaminated Soils (within an intermittent drainageway)

The eastern drainageway begins approximately 200 feet northeast of the site and flows south along the eastern border of the site. Run-off from the eastern one-third of the site flows into this drainageway. The drainageway then flows in a south-southeasterly direction toward marshy areas before entering perennially flowing Prairie Creek. Results of the CERCLA SIP sampling revealed the presence of antimony, cadmium, copper, lead, nickel, and zinc which met or exceeded the CERCLA program's criteria for an observed release.

3.4 Aboveground Tanks and Drums

Over the years of its operation, several aboveground tanks and drums were in existence at Sandoval Zinc.. Currently, two tanks and two drums remain on site. One of the tanks still contains a small, but unknown amount of fuel oil. A spill in November 1991 resulted in the release of an estimated 200 gallons of #5 Fuel Oil. The spill ran off site and into the western drainageway. The Illinois EPA and the USEPA responded to the spill and put booms in place to contain the spill. USEPA and their contractor used a vacuum truck to clean up the spill. The western drainageway is a tributary of Prairie Creek.

According to IEPA Bureau of Land files, drums were located in three separate piles: one on the northern side of the buildings and one on the south side. Also, a pile of crushed drums was discovered in one of the buildings. It is believed that they were used by Sandoval Zinc.. The total number of drums found and their contents are unknown. All drums, except for the two mentioned previously, have been removed.

SECTION 4

MIGRATION PATHWAYS

4.1 Groundwater

The Sandoval Zinc site is located in the south central portion of the Illinois Basin, a large Paleozoic spoon-shaped sedimentary basin. Surficial deposits overlying the bedrock strata of the basin are primarily unconsolidated glacial tills, outwash, and drift. The thickness and composition of these glacial deposits vary across the state, typically thinning to the south.

The glacial deposits of south central Illinois are composed of till, poorly sorted clay, silt, sand, and pebbles laid down during the four major Pleistocene advances of the glaciers (the Nebraskan, Kansan, Illinoian, and Wisconsinian glacial advances).

The general stratigraphy at the site, beneath the artificial cinder fill, consists of glacial deposits of varying thickness overlying the Pennsylvanian Bond Shale. According to IEPA Bureau of Land files, the glacial deposits, to depths of approximately 20 feet below ground surface, consist of the Peoria Loess and the Roxana Silt of the Wisconsinian Glacial Stage; the Berry Clay of the Sangamonian Stage; and the Illinoian Stage Hagerstown Member and the Glasford Till. These glacial deposits represent the aquifer of concern.

The Illinois State Water Survey (ISWS) and the Illinois State Geological Survey (ISGS) conducted geologic and groundwater studies at the site from 1975 to 1982. The largest portion of the field work was conducted between July 1974 and April 1977. Forty-nine monitoring wells were installed at the facility in 36 different locations during the study. The objective was to study the effectiveness of glaciated soils in the area to retain toxic metals and to define vertical and horizontal migration patterns of the contaminants through the soil. Most of these wells were classified as non-functional by the early 1980's. Groundwater flow in the Hagerstown Member cannot be determined at the site, possibly due to confining layers.

In addition to the monitoring wells installed by the Illinois State Water Survey, the IEPA also installed several monitoring wells. Three were installed in April 1987 and two in June 1990 as part of a continued study of the site. Contaminants detected in these wells included (in parts per billion):

arsenic-17, cadmium-45, lead-34, manganese-1500, silver-140, thallium-190. These concentrations meet or exceed the CERCLA program's criteria for an observed release and also meet or exceed the USEPA Maximum Contaminant Levels (MCLs) for drinking water.

A residential well was also sampled during the 1990 study. Sample results from this well revealed the presence of iron (2660-2770 ppb), manganese (160 ppb), silver (60-61 ppb), thallium (100 ppb), and zinc (88-96 ppb). Silver and thallium in the residential well samples exceeded Federal Drinking Water Standards of 50 ppb and 0.5 ppb, respectively.

4.2 Surface Water

Two intermittent streams border the site, one on the east and one on the west. Drainage runs off-site and into these streams. The Probable Point of Entry (PPE) into a perennial waterway for the eastern drainageway is located in a Palustrine Emergent wetland, approximately 300 feet east-southeast of the facility. Another point of entry is the pond located immediately east of the site. The pond is considered a wetland and a fishery. The PPE for the western drainageway into a perennial waterway is located approximately one-half mile southwest of the site, where the drainageway enters into a Palustrine Emergent wetland.

The 15-mile target distance limit for the eastern drainageway extends from the PPE approximately one-half mile to the confluence with Prairie Creek. Prairie Creek then flows approximately twelve miles to Lost Creek. The target distance limit for the pathway ends approximately two and a half miles southwest of the confluence of Prairie Creek and Lost Creek.

The 15-mile target distance limit for the western drainageway extends from the PPE approximately one-quarter mile south to the confluence with Prairie Creek. Prairie Creek then flows approximately twelve and one-quarter miles in a southwesterly direction where it enters Lost Creek. The target distance limit then extends two and one-half mile southwest of the confluence of Prairie Creek and Lost Creek.

There are no drinking water intakes within the 15 mile target distance limit. Prairie Creek and Lost Creek are believed to be fisheries by the Illinois Department of Conservation. The surface impoundment located to the east of the site has been used as a fishery, as witnessed by Sandoval

police. Several wetland areas exist along the 15-mile surface water pathway of the site. The nearest wetland is located in the pond immediately east of the site.

Elevated levels of the following metals were detected in sediment samples from along the surface water pathway: antimony, cadmium, copper, lead, mercury, nickel, and zinc.. The concentrations of these contaminants decreased as distance from the site increased.

4.3 Soil Exposure

The area surrounding the site is considered to be rural and there are no residents living on or within 200 feet of the site. The nearest residence is located approximately 800 feet west-northwest of the site. Unauthorized persons access the site frequently as witnessed by the Sandoval Police. Access is gained by persons through the chain-link fence.

4.4 Air Pathway

Contaminants have been documented to be present within the top two feet of soil in and around the site. Potential for the ongoing release of airborne particulate from the facility is great due to the lack of vegetative cover and lack of windbreaks around the site. The approximate number of persons living within a four-mile radius of the facility is shown in the following table:

Onsite	0
0-1/4 mile	28
1/4-1/2 mile	492
1/2-1 mile	796
1-2 miles	263
2-3 miles	1881
3-4 miles	<u>434</u>
Total	3894

SDMS US EPA Region V

Imagery Insert Form

--

**Some images in this document may be illegible or unavailable in SDMS.
Please see reason(s) indicated below:**

--

Illegible due to bad source documents. Image(s) in SDMS is equivalent to hard copy.

Specify Type of Document(s) / Comments:

--

--

Includes ___ COLOR or RESOLUTION variations.

Unless otherwise noted, these pages are available in monochrome. The source document page(s) is more legible than the images. The original document is available for viewing at the Superfund Records Center.

Specify Type of Document(s) / Comments:

--

--

Confidential Business Information (CBI).

This document contains highly sensitive information. Due to confidentiality, materials with such information are not available in SDMS. You may contact the EPA Superfund Records Manager if you wish to view this document.

Specify Type of Document(s) / Comments:

--

x

Unscannable Material:

Oversized ___x___ or ___ Format.

Due to certain scanning equipment capability limitations, the document page(s) is not available in SDMS.

Specify Type of Document(s) / Comments:

TOPOGRAPHIC MAPS (2)

--

Document is available at the EPA Region 5 Records Center.

Specify Type of Document(s) / Comments:

--